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ABSTRACT

This paper reports on a study that explores the literature of technostress--the anxiety over using technological equipment--both inside and outside of the library field. Fifty-eight unique articles were abstracted and evaluated. By using a coding sheet a measurement was taken of symptoms, reasons given for the "modern disease," and recommendations on how to combat technostress. The results of the coding sheet were then graphed. The results showed a high percentage of fear and anxiety as symptoms, and showed "performance anxiety" and "inexperience with computers" as the top two reasons given for technostress. Training was the most frequently cited recommendation to either avoid or combat technostress. Two appendices contain the coding sheet and tables and graphs illustrating the results. (Contains 61 references.) (Author/DLS)

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ED 423 911

TECHNOSTRESS: A CONTENT ANALYSIS.

A Master's Research Paper submitted to the
Kent State university School of Library Science
in partial fulfillment of the requirements
for the degree Master of Library and Information Science

by

Robin Clute

May, 1998

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Technostress is considered a psychosomatic illness that involves either anxiety over using technological equipment, or overidentification with the computer. This study explores the literature of technostress both inside and outside of the library field. Fifty-eight unique articles were abstracted and evaluated. A measurement was taken of symptoms, reasons given for the "modern disease" and recommendations on how to combat technostress, by using a coding sheet. The results of the coding sheet were then placed into graphs. The results showed a high percentage of fear and anxiety as symptoms, and that "performance anxiety" and "inexperience with computers" as the top two reasons given for technostress. Training was the most cited recommendation to either avoid or combat technostress.

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CHAPTER I.

Introduction

With the advent of any new technology, associated problems arise. Machines have always had their detractors. In the early nineteenth century, the Luddites were millworkers who destroyed the machines they felt were taking their jobs. Their fears were real. Yet, never in history have machines changed so much and so fast as today's computers. From large mainframes in the early days, to the desk top personal computers today, computers evolve daily. Almost before it hits a retailer's shelf, a PC is considered "obsolete." In the twentieth century, workers do not destroy the machines that threaten them, but as psychologists Michelle Weil and Larry Rosen state, "Technology may do wonders *for* us, but it is also doing something *to* us." (Weil 1997, 5) With computer automation and integrated systems in libraries, CD-ROMs and multiple databases, and the Internet and the World Wide Web, a "modern disease" named "technostress" (Brod 1984, 16) has developed due to the rapid changes in technologies.

Librarianship has changed dramatically over the last twenty years, and the majority of that change is due to automation. Fifteen years ago, Online Public Access Catalogs (OPACs) were virtually unheard of, and OCLC and *Dialog* were among the few computerized databases that librarians had contact with. Now, some libraries are on their second automation system, most are automated, and the few remaining are contemplating automation for the first time. Yet, it is not just the computerized catalogs and integrated systems that cause technostress. Another whole layer of searching has been added with CD-ROM databases, as well as the Internet and World Wide Web. If

that was not enough, printers run out of ink and paper, and users are as unfamiliar with the technologies as staff are.

With all that in mind, technological change does not have to be a bad thing. With proper planning and implementation, and the increasingly user friendly interfaces, even the most resistant computer-phobic can learn to use the tools at her fingertips—as long as all individuals see technology as a tool, and not as the answer to all the ills of the library. Librarians and staff have always had to balance patrons and other tasks.

In a time of "multi-tasking," a recent term also coined by the computer age, technology in libraries can beneficial. Most of the routine tasks have been automated. Access to sources outside the library opens up a new world in reference service. The benefits of technologies outweigh the drawbacks, yet there is a definite resistance to change among library staff.

Background of the Study

Technostress is a fairly recent word added to the lexicon. Attributed to Craig Brod in 1984, but used as early as 1983 in a Washington Post article (OED 1989), technostress is considered a psychosomatic illness that involves either: 1) anxiety over using technological equipment; or 2) over identification with the computer.(Brod 1984, 16) This definition takes it a bit farther:

> Technostress is a modern disease of adaptation caused by an inability to cope with the new technologies in a healthy manner. It manifests itself in two distinct but related ways: in the struggle to accept computer technology, and in the more specialized form of overidentification with computer technologies (Brod 1984, 16).

Brod's model includes symptoms of ambivalence, reluctance and fear of computers, which all translate into anxiety. Anxiety manifests itself in other ways: irritability,

headaches, nightmares and insomnia, technological resistance, or technological rejection, and an assortment of other symptoms. It affects "those who feel pressured—by employers, peers, or general culture—to accept and use computers" (Brod 1984, 16).

Other symptoms have been observed, such as isolation and frustration, negative attitudes toward computers, self-negativity, and using statements like "I don't do that" when referring to CD-ROMs, either searching or servicing. Also, there is an inability to cope, and a general feeling of panic when confronted with a task that must be done on the computer (Kupersmith1992, 9).

In Craig Brod's definition of technostress he mentioned not only the inability to cope but "overidentification" with the computer as another aspect of technostress. This occurs when a person is "technocentered," becoming more and more computer-like. The person who "overidentifies" with the computer becomes less emotional, more impatient with people. There is "a loss of capacity to feel and to relate to others" (Brod 1984, 17). Exhaustion is often coupled with this, and factual thinking, while not necessarily a harmful thing, becomes the person's mindset.

Technostress is not always technological in nature. It may not be the computer at all that creates fear and/or stress in the individual. Change in itself is frightening and powerlessness may be at the root of many resistors. As such, technostress can be divided further into four distinct but related components: performance anxiety, information overload, role conflicts and organizational factors (Kupersmith 1992, 8). Each of these can affect the lives of librarians and other library staff.

Purpose of the Study

The purpose of the study is to show: 1) that technostress does exist in libraries because of the rapidly changing technological environment; 2) that both library staff and users are affected by the increasing technological factors, and 3) that there are answers to combat these effects. The library literature shows an awareness of Brod's definition of technostress and there are additional interpretations that fit the library field.

Limitations of the Study

As the term "technostress" is a modern term, the literature included shall be from 1984 to the present. The literature, however, will include academic, public, special, and school libraries and also literature outside the field on technostress as well.

Definition of Terms

Technostress: Technostress is a modern disease of adaptation caused by an inability to cope with the new technologies in a healthy manner. It manifests itself in two distinct but related ways: in the struggle to accept computer technology, and in the more specialized form of overidentification with computer technologies (Brod 1984, 16).

Performance anxiety: "Debilitative thoughts and statements, negative self evaluation, expectations of failure or distracting thoughts" (Kupersmith 1992, 8).

Role conflicts: When roles are no longer clearly defined. For example, "an expert searcher is reduced to the role of CD ROM attendant, fiddling with paper jams and spent ink cartridges . . ." (Kupersmith1992, 9).

Organizational factors: Factors such as insufficient staffing, particularly because of the misconception that technology has made the job easier; not enough terminals, printers, etc., for users; lack of management, either in training, or providing information about systems. Another aspect is if decisions on automated systems were made without library staff being a part of the decision, then some staff may reject the new system.

Integrated systems: A computer system that supports many of the library functions, such as circulation, online public access catalogs, ordering and acquisitions, cataloging and management information (Rowley 1992, 317).

OPACS: Online public access catalogs, which provide a database of library collections and other services.

CHAPTER II.

Literature Review

The rapidly changing nature of technology has created a need for knowledge of what is, and will be, expected of librarians, staff and users in the future. The literature that will be reviewed carries the term "technostress" within the title, subject or abstract of the article.

John Kupersmith, in his article "Technostress and the Reference Librarian" (1992), has produced one of the foremost articles on technostress in libraries. He identifies technostress and its components: performance anxiety, role conflicts, information overload and organizational factors, and how all of these factors lead to burnout. Kupersmith also identifies individual strategies to combat technostress, such as cultivating a positive attitude, time management and setting realistic goals. On an organizational level, he advises department heads and staff managers to believe in each individual, foster cooperation and provide opportunities for hands-on practice, plus many more strategies. He concludes that there is no magic to wish technology away, but there are ways to ease into the computer revolution.(Kupersmith 1992, 13)

Carl Hanson (1994) finds that the automation frenzy has divided librarianship into two sections: the humanists and the technoids. In his article "Trekking with the Technoids: Public Service Librarianship in the Year 2010," he characterizes the humanists as clinging to old ways of doing things, and the technoids of exalting the database, yet notes that both have a good deal of common ground. The merits of automation have been undercut by the frenzied pace of implementation, and costly

mistakes. Hanson foresees a congruence of automation and librarianship that will meld the two divisions, and perhaps create a utopian-like medium ground.

Jeanette Woodward (1997) deals primarily with librarianship and the older learner in her article "Retraining the Profession, or, Over the Hill at 40". She finds that there is a growing resentment among the younger librarians, who know how to deal with the technologies, and the older librarians, who want nothing to do with the technologies and only acquire the basic skills to carry themselves through the routine duties. She notes that the "baby boomer" generation and its older siblings went to school prior to the arrival of automation in libraries and these generations are the fastest growing age group in the work force. Interestingly enough, Woodward suggests that computer skills are learned, and that there is no evidence to support the belief that people stop learning as they age. She states that often the real answer is improving the workers self-esteem, thus making them more productive.

The cultural aspect of electronic information retrieval is Irene Sever's focus in "Electronic Information Retrieval as Culture Shock" (1994). "Culture shock" is what workers and users experience when faced with some new aspect, or unfamiliar cultural experience (Sever 1994, 336). The physical forms taken by technology, such as screens versus printed pages and the need to press keys in order to operate the equipment only increase the difficulty in acceptance of technology. Sever states that because older generations have not been raised in an electronic environment, it is difficult for them to accept new technologies, whereas the younger generations have taken to technology "as ducks take to water." This also provides a reason why older people do not ask for help. Since the help may be in the form of someone half their age. They do not want to appear

ignorant in asking the younger person for help. She concludes that librarians need to be the agents of socialization, to serve as guides to those who resist change.

Virginia Moreland says in her article "Technostress and Personality Type" (1993) that the different aspects of technology produce greater stress for different personality types. People learn differently, and these differences should be taken into account. Using the Myers-Briggs Type Indicator, and psychological type literature, identification can be made of the likely sources of stress for diverse personality types. She notes that there are sixteen possible psychological types; however, she also believes that the concepts of type should never be used to pigeon-hole, typecast or limit someone's possibilities.

Avoiding technostress is Greg Byerly's point in "Introducing Staff to Change" (1990). Training and implementation should be started with patience. Byerly states that with "positive progress" the staff can be introduced to changes in technology. There are "Six points of Positive Planning," which are: planning, participation, preparation, preview, prudence and patience (Byerly 1990, 39). With these points, the automation process can be a somewhat painless one. Byerly breaks down each point, giving practical methods of dealing with issues such as previewing technology, and keeping based with reality when it comes to schedules. Finally, he concludes that directors and managers must find ways to introduce change in the least threatening and most positive way, in order to have staff fully cooperate and embrace technology.

Shelly Heaton and Jeanne M. Brown look at technology as a series of incentives and hurdles in their article "Staff perceptions of Incentives and Hurdle to the Use of Technology." (1995). The Technology Committee of the University of Nevada, Las

Vegas (UNLV) administered a survey to the staff in spring of 1994. Their results concluded that the "hurdles" were often due to supervisory problems, lack of communication and time/staff levels. Some staff felt that they were "bogged down" by the information they were receiving in the automation implementation. However, the "incentives" were training and a newsletter published by the Technology Committee called *TechNotes*. Most of the staff recognized that technology was essential, but a third felt that their background and experience was actually a "hurdle" to overcome in learning the new technology.

The focus of Rachel Daniels' article "Effects on Non-professional Staff of the Implementation of Computer-based Library Systems in College Libraries" (1995) is on three college libraries' non-professional staff. The libraries surveyed had implemented new automation systems within the last two years. Interviews by phone were conducted of as many of the non-professional staff as possible, as well as the librarian in charge. Daniels' findings were that the staff's large range of age and experience had little effect on how they faced their new system. Instead, *personality* of the individual had far more effect on whether they learned easily or not. Stress, due to the new technology, was completely different for all three libaries—one library's staff was concerned about when the system would crash, while another library's staff was concerned over fines and policies. The third library found that they were busier due to their new technology, which added to their stress. Training and communication were found to be key elements in the staff's coping with the new automation. The library that had the most problems had limited the information that was distributed to staff. The non-professional staff knew this and resented that they were not getting the whole picture. (Daniels 1995, 11)

Virginia Bartlett talks about the causes and symptoms of technostress in her article "Technostress and Librarians." (1995) She cites research from both Craig Brod (1984) and John Kupersmith (1992), relaying that there are physical and psychological stressors which, coupled with insufficient training and lack of standardization, contributes to technostress in libraries. Another issue that Bartlett raises is that of jargon, and how the technical language of computers causes intimidation and fear in users (Bartlett 1995, 227). She concludes that overcoming technostress is something that librarians can do by talking to vendors to make their products easier to use (Bartlett 1995, 228) and that time must be allowed for the training of employees, since change is often difficult in organizations. She also advocates the use of the Myers-Briggs Type Indicator that Virginia Moreland (1993) wrote about and a participatory management style to give employees more of a sense of ownership in the automation processes.

Linda Dobb's experience with a major computer disaster is the subject of her article "Technostress: Surviving a database crash." (1990) In 1987, the database of the Kennedy Library of California Polytechnic State University "crashed" when a glitch in a back up tape delivered garbled and unreadable data. Approximately 300,000 out of 500,000 records were effected, leaving all the title entries from A to M without bibliographic records. Data recovery efforts found that the cost was going to be high, and would take a long time. At that point, staff morale "plummeted" and "technofear" set in (Dobb 1990, 66) The process of recovery ended up taking seven months, and the staff was reluctant to use the computer system when it was brought back up. Dobb states that some of the staff "even experienced the classic stages of bereavement: denial, resistance, anger and depression." (Dobb 1990, 66) She gives ideas, however, on how libraries

should prepare themselves to avoid and cope with the possibility of a database crash: 1) Have a contingency plan, much like you would have a disaster plan; 2) Use preventative measures; 3) If outsiders are responsible for a crash, get tough; 4) Think about the impact a crash has on staff attitudes. Dobb also gives what lessons her library has learned, ranging from "Be positive" to "Forget past difference and work together toward a smooth recover." (Dobb 1990, 67).

Katie Clark and Sally Kalin explore how even those who embrace technology can be at risk, in their article "Technostressed Out? How to cope in the digital age." (1996) The authors state that it is not the technology that is the culprit, but the "pace of technological change that has us reeling." (Clark and Kalin 1996, 31) They also state that it is "resistance to change" that is the real definition of technostress, and that stress is a natural reaction. However, that reaction should only be temporary. Managers should be role models and set about learning new software. Communication is the key in the battle to avoid technostress. Also, another way to deal with technostress is to hire people with the necessary flexibility and coping skills since technological proficiency is a job requirement nowadays. The authors also bring up the training issue. Training is critical for all staff, and the timing of training is very important—coinciding with "people's actual need to use the technology." (Clark and Kalin 1996, 32) Practice and reinforcement is also a must. Technical support is considered essential, with competent people to deal with the hardware and software problems. The authors conclude with a reiteration of all of the above ideas, as well as the issue of fiscal funds should be appropriated to upgrade and repair PC's.

In Barbara Call's article "PC Phobia: Lack of knowledge leads employees to fear their computers," (1986) the author explores the reactions of employees who are undergoing training either for the first time, or just after in-house training. "PC phobia," she says, is fear of the unknown, and "fear of making mistakes . . . in front of your colleagues." (Call 1986, 80) Several PC training consulting firms were interviewed, and the trainers divided phobia sufferers into several categories. Beginning users and women often suffer more PC phobia, as well as employees who have little or no input in the planning process of automation. PC phobia, however, can be overcome, Call reports, by training—individualized and hands-on—and involvement of employees in future planning processes of organizations. (Call 1986, 81)

Donald Rothberg gives a small example of "computer phobia" in his article "Fear and loathing of Cyberspace not uncommon." (1997) He asserts that "computer phobia," or technostress, has shown up in the federal government, and that even the president did not use e-mail until his daughter went away to college. Rothberg cites embarrassment, fear, and the idea that computers are "impersonal monsters" as reasons given for the phobia. (Rothberg 1997, A4) Absenteeism in the federal government has also risen, and technostress is the suspected cause.

Mary Gluckman's article "The dark side of the boom" (1991) reveals a very pessimistic view of how employees are affected by new technology. Gluckman interviews Craig Brod, who coined the phrase "technostress," who asserts that isolation and disconnection are rising in individuals in the "bottom levels of electronic hierarchies." (Gluckman 1991, 37) Communications are cut off in an effort to measure quantity (via the computer) rather than quality. In an interview with a human resources

consultant, Gluckman likens technostress to symptoms of post-traumatic stress syndrome, and says that people "operate from a position of chronic performance anxiety and background stress." (Gluckman 1991, 38) Brod, Gluckman reports, believes we need to "reevaluate our value systems" and "coevolve with technology" if we are to exist in any kind of peace. (Gluckman 1991, 38)

Reid Goldsborough's article "Battling computer phobia" (1997) states that "for every person smitten with the power of a PC, there's another person cowering." (Goldsborough 1997, 1) Goldsborough explores performance anxiety and fear, and how even training does not stick with some employees. In effort to combat the effects of computer phobia, Goldsborough believes that first and foremost the person must understand that they are not alone in their fear. Then, the computer phobic can move on to trying the basics, i.e., playing games which makes the user more familiar with the mouse and the keyboard. Also, it is important, according to Goldsborough, not to worry about breaking the computer. Other points are to simply take learning slow and easy, forgive mistakes (but do not forget them), and to reward successful completion of training programs by offering days off, or even a drawing for a home computer.

Walter Giesbrecht and Roberta McCarthy explore "Staff resistance to library CD-ROM services." (1991) This article resulted from a question posted on an electronic forum. The question was about resistance to technology. They found seven categories of responses to their questions, given primarily from academic libraries: 1) Psychological reasons, i.e., fear of the unknown; 2) Problems with multiple interfaces and the need to learn all of them; 3) Increased teaching load, i.e., the need of the user for more assistance; 4) Increased costs; 5) Increased stress, i.e., the feeling that technology has

been imposed on them (the workers); 6) Time required to maintain CD-ROM services; and 7) Hardware/software issues such as no standardization. Although these all were considered adverse reactions by the forum and authors, resistance to library technologies was recognized as nothing new, and "the reasons for resisting CD-ROM are much the same as those for resisting technology in general." (Giesbrecht and McCarthy 1991, 36) While the authors did not dismiss the categories, several were thought to be needless (i.e., increased costs, since print sources cost as much; and teaching loads, since the librarians rarely taught students how to use print indexes).

Fear of technological tools is what Mike Livingston reports on in his article "Technophobic." (1993) He states that "the future is in the fast lane" and that "fear of technology . . .[is] the phobia of the 1990's." (Livingston 1993, D1) Livingston breaks down a survey done by Dell Computer Corporation in 1993 which revealed that thirty-two percent of adults are intimidated by computers, and twenty-five percent would not use them "unless forced to." (Livingston 1993, D1) Of all those considered "technophobic," sixty-seven percent are adults, with women being the majority, and thirty-three percent are teens. "Jargon" is one of the reasons Livingston gives as to why people remain resistant to technology. The other major reason for resistance are socialization factors, and he cites Alvin Toffler's dire prediction that the American civilization will have to be restructured due to our shift toward technology. (Livingston 1993, D2)

Bob Grove's article also deals with the Dell Computer Corporation survey and a psychiatrist's fear of computers in "Man vs. Machines: Techno-terror." (1993) The psychiatrist, Dr. Steven Simring, relates to Groves that he felt "uncomfortable near the

computer" and that he "recoiled from the very language of computers." (Groves 1993, A1) Groves then leads in to the Dell survey, relaying that fifty-five percent of Americans were still resistant to technology at the time the article was written , and that women were more technophobic than men. He also brings us the themes of technophobia that run through science fiction and horror literature, such as Frankenstein, 2001: A space odyssey, and Christine. Therapists interviewed by Groves attribute technophobia to fear of failure, loss of control, and low self-esteem as well as to fear of the unknown. Another factor, according to Groves, is that new technology has an age threshold: people over fifty find it more frightening than younger people. (Groves 1993, A1) Overall, Groves concludes that the "most typical tactic" people use to cope with their fear of technology is avoidance behavior.

Kate Hickey and other members of the Technology Committee of the Community and Junior Colleges of the American Library Association document cases where technostress is caused by a variety of factors. Their article "Technostress in libraries and media centers" (1992) covers community college libraries in Kentucky, Florida and Georgia, where implementation of a new automation system coincided with the addition of other technologies: CD-ROMs, fax centers, e-mail as well as some other new services. The Kentucky community colleges fared the best, but found staffing patterns had changed with the need for more, not less, staff for the public service sector to handle the new demands. Training and planning were considered the key to their success. In the Florida community college libraries, an inventory of holdings coincided with the new technologies, leading to "shocks and frustrations" due to the changing information environment. (Hickey et.al. 1992, 18) They also chose Macintosh computers after the

staff had been familiar with MS DOS based applications, and the training took staff away from hectic public service, causing a new level of stress when desks were not covered. Another problem was insufficient time for staff to practice before implementation took place. In Georgia, the DeKalb College libraries also went through varied technologies simultaneously, but their problem was different. "Loss of traditional information," which included visually seeing the amount of circulation they had done, who and how many overdue slips were being sent out, as well as the uselessness of the shelf list, made the staff's adjustment stressful. (Hickey et.al. 1992, 18) Rapid change and improvement also created anxiety, with no end in sight. The authors recommend ways to combat technostress, which includes balancing private and work life; a participatory management style; and most of all, training and communication. Hickey concludes that technostress will never be eliminated, since technology is here to stay.

Connie Koenenn defines symptoms of an illness in her article "Technostress: The high price of a high-tech world." (1990) Symptoms include tension, paranoia, fatigue among others, and she attributes these symptoms to technostress. Even headaches and back pains, according to Koenenn, are caused by fear of technology. (Koenenn 1990, D1) Rapid change is one of the reasons given for this fall out as well as isolation factors (people communicate via e-mail instead of in-person). Craig Brod is interviewed and states that high-tech creates the stress for perfection, and that "technostress victims react with anger and hostility." (Koenenn 1990, D1) Impatience is another reaction due to technology—people are more impatient when loading software, etc. However, Koenenn also consults Ann Majchrzak, an organizational psychologist, who states that technostress is really caused by a lack of training and communication from management. Majchrzak

gives examples of how successful companies devote up to "ten percent of their time to on-going high-tech training" and that it is much preferred to give employees time to prepare for and accept new technology. (Koenenn 1990, D1)

Debbie Galant relates how the world of the Wall Street analysts has changed in her article "The technology trap." (1994) The new technology has connected financial analysts and made them even more competitive, but at what price, Galant asks. One analyst is quoted as saying "If I don't use it [technology], I'll be at a competitive disadvantage." (Galant 1994, 141) Although computers, fax machines, voice mail and e-mail have made analyst's jobs easier, they are also tied to their clients and firms twenty-four hours a day. The proliferation of gadgetry also undermines the quality of their research, and the resulting information overload gives the analysts technostress. Speed is the product of new technology. Galant also finds some brokerage analysts have been "cut . . . out as the middleman" due to teleconferencing. (Galant 1990, 142) As analysts scramble to keep up, they are writing "thought" pieces, in which one analyst included over five pages of computer terms as a glossary. "These days every analyst has to be in part a technology analyst," Galant states, yet a top ranked savings and loan analyst boasts that he has never used a computer, and still only uses a 20 year old calculator and legal pad. (Galant 1990, 143)

Michelle Rapter's article "Technostress takes toll in Internet users" (1998) discusses that among the manifestations of technostress is an inability to focus or concentrate on anything for a significant amount of time. She cites Michelle Weil and Larry Rosen's (1997) research on how technology has created high expectations, and that the constant waiting for e-mail, software and World Wide Web pages to load has created

technostress in Internet users particularly. Adverse behavior also includes a decrease in work productivity, insomnia, losing your train of thought, and even changes in sleeping patterns. (Rafter 1998, D8) Some people feel compelled to check their e-mail even in the middle of the night. Some Internet users also take advantage of their Internet anonymity to behave in ways they would never normally, particularly in chat rooms. Yet, e-mail breaks in the workplace might be a good idea, Rafter finds one user saying.

Richard Hudiberg conducts a study to measure technostress in his article "Psychology of computer use VII: Measuring technostress: Computer related stress." (1989) A Computer Technology Hassles Scale was developed in order to measure computer related stress, and given to both undergraduate and graduate students at the University of North Alabama. The sample was predominantly female, and the majority of the sample has taken a computer course and/or used a computer. The results of the study indicated that the subjects perceived "moderate stress" and "few subjects reported high stress." (Hudiberg 1989, 770) Most frequently checked hassles were: computerized junk mail; the computer system was down; lack of expertise; and keyboard typing errors, among others. Hudiberg states that the Perceived Stress Scale scores "were significantly correlated with sex" and that "women tended to perceive more stress than men." (Hudiberg 1989, 770) The study also indicated that those who perceived more stress "tend to experience more hassles with computers and have slightly more negative attitudes toward computers." (Hudiberg 1989, 771) The more people use computers, Hudiberg says, the more likely they are to experience a hassle. However, he suggests "if a person experiences stress when dealing with computer technology, it has little to do with attitudes toward technology." (Hudiberg 1989, 771)

Anne Fliotsos gives a view from a college library perspective in "Anxiety layering: The effects of library computer anxiety on CD-ROM use." (1992) Multiple interfaces or "vendor differences" are a big problem for both librarian and student. Students also believe that *everything* is in the computer, and do not go on to print sources. Faculty, on the other hand, can be afraid of CD-ROMs, and hesitant to use them. Fliotsos gives an example of an interview with a "humanist researcher" who "explained that humanists do not use a linear research style" and that "technology does not always mesh with the needs of the humanist researcher." (Fliotsos 1992, 48) Role conflicts occur when librarians need to put paper in printers, load software, and so on. Another problem Fliotsos sees is obsolescence—products, hardware and software are obsolete almost as soon as they are purchased. Network options can be a source of stress, and training is definitely a must. However, the first step, Fliotsos says, is for people to realize that they are not alone in their fear of technology.

Richard Lally's article "Managing technostress" (1997) focuses on how managers do not deal with their own fears of technology. Burn-out and information overload are cited as one of the leading causes of ill health in managers, and technostress is considered the culprit. "The majority of American managers suffer a technological knowledge gap," Lally states. (Lally 1997, 5) Many managers do not even know how to type, and their reluctance to learn "sends a message that pervades their departments." Lally also says that the way for employees to have confidence in technology is to see their managers use it. Asking employees for their input is critical, and training should be comprehensive and ongoing. An on-site help desk to address technological problems is a

must, but if there is no formal help desk, then tapping the resources of those employees who are the most comfortable with the new technology is crucial. (Lally 1997, 6)

The article "Self-help is on the way" (1997) is partly a book review, partly a commentary. Eric Nee discusses the book TechnoStress: Coping with technology @work @home @play by Michelle Weil and Larry Rosen. Nee terms it as a "self-help book for people who panic at the sight of computers," and says the book would have benefited from more humor. Jargon is a problem, Nee comments, because the computer industry is dominated by engineers, and thus the products are hard to use. However, he states that the authors, Weil and Rosen, stretch the thesis too far when they say that modern technology "tends to alienate us from one another" and increases people's stress levels, leaving them feeling incompetent and inadequate. He also disputes that the "profusion of technology makes life today more stressful than it was in the past." (Nee 1997, 198) His point is to think about how our ancestors crossed the stormy Atlantic in a cargo hold, or were quarantined for months at Ellis Island, or made their way across the Great Plains to "scratch out a living on a desolate farm." (Nee 1997, 198) Technostress pales in comparison to the hardships of the past. Weil and Rosen have termed the computer waiting periods (software loading, etc.) "technologically captive moments," turning it into a malady, which Nee disputes. He asks, "Should we now have 'naturally captive moments' " when we wait for rain, or snow to stop so we can go outside? (Nee 1997, 198) Nee does recommend that the book be read by anyone who designs high-tech products.

Laurie Larwood's article "Women workers as users of computer technology," (1992) raises the issue of how women are impacted by new technologies. Larwood

states that "the experience of women indeed has been substantially different than men" Larwood 1992, 38) in that women are usually at the lower end of the pay scale and are perceived as less adequate. Computers are leading to changes, Larwood reiterates, and trends include "deskilling," when tasks run by computers require less educated and lower paid individuals. Another trend is that standards become higher due to the computers ability to create a perfect document, so secretarial staff would not be "deskilled" but instead have their standards increase. "Complex high-level tasks" performed by artificial intelligence programs may perform tasks that take the place of physicians; and computerized tasks in areas "where human labor was either too expensive or non-existent" (Larwood 1992, 38) is another trend that may increase employment. These trends still imply that the fields are dominated by men, but women who plunge into these fields should do as well as men. However, Larwood says, women are users and not designers of technology. If women can modify their work patterns, they will not be hurt by computerization. Those unable to adapt will face being phased out, or "deskilled." (Larwood 1992, 39)

Catherine Edwards, Joan Day and Graham Walton write about academic libraries in the United Kingdom in "Impel Project: the impact on people of electronic libraries." (1995) The Impel Project was run by the Information Services Department and the Department of Information and Library Management at the University of Northumbria at New Castle. Eighty-two in-depth interviews were conducted and brief questionnaires based on the Likert scale were distributed to staff of six university libraries. The results of the questionnaires were then broken down into three groups of staff hierarchy: library assistants, information librarians and senior managers. The responses to the

questionnaires and interviews found that technology did not reduce workloads, but changed tasks. Teaching loads were heavier due to the demands of new technology and "huge increases in enquiry work" were reported by staff. (Edwards, Day and Walton 1995, 204) Job satisfaction, however, also increased. Frustrations did occur when staff was unable to practice on new systems. Lack of technical support also caused anxiety. Very few of the staff admitted to being totally against technology. Most agreed strongly that the new technology made them more effective in their work (Edwards, Day and Walton 1995, 205), but the staff also felt frustrated by their lack of technical expertise and inability to keep up with electronic developments. Surprisingly, the staff strongly disagreed with the statement that working in an electronic environment isolated them from their colleagues and users. They also did not believe that technology would put them out of a job. The authors found most responses positive and enthusiastic, and planned to continue the Impel Project surveys. (Edwards, Day and Walton 1995, 208)

Cathleen Palmini's article discusses a 1992 survey of academic library staff in Wisconsin. "The impact of computerization on library support staff" (1994) looks at year of employment, type of automated systems, adequacy of training, job satisfaction and overall change in effectiveness since computerization, among other questions. Palmini reports that the sixteen question survey elicited over two hundred responses. The results showed a stable staff, where "nearly one-third of the total group has been employed in a support staff position for over fifteen years." (Palmini 1994, 120) The staff reported that they often had to work in multiple places, thereby having to deal with different computer applications in different areas. Over seventy-five percent used the online catalog regularly, and two-thirds used word processing and e-mail. Health problems due to

computers were considered to have increased, and one source of frustration was poorly written manuals and inadequate training. While computers have increased the effectiveness of serving patrons, the support staff considers their jobs to have increased, due the demand. Computer related frustration totaled sixty-two percent, with the "computer is down" and "work load, being understaffed" leading the two most cited reasons for frustration on the job. Palmini concludes that changes suggested by the survey should include adequate training, and attention to ergonomics in the libraries. She also states that with the rapid changes, the support staff has been "reasonably extraordinary" in adapting to automation. (Palmini 1994, 127)

Charles Seavey's article, "A failure of vision: Librarians are losing the war for electronic professional turf," (1993) addresses the problem that libraries are way behind in technology. Seavey points out that although librarians provide the primary market for commercial databases and CD ROMs, they often have obsolete equipment and very little training. Seavey tells an anecdote about a colleague who hired a computer savvy library technical assistant. The technical assistant became very popular in helping departments with their computers. Yet, because the technical assistant did not have an MLS, the assistant director of the library decided that the technical assistant "should devote himself to nonprofessional tasks, like making sure the printers had ribbons . . ." (Seavey 1993, 944) Seavey says the problem is that "we are still mired in the realm of bibliography" and that if hiring a non-librarian is necessary, then do it. (Seavey 1993, 944) If it takes investing in training for existing librarians, then consider it necessary—or "we are going to be relegated to low-paying custodial jobs in buildings full of unused paper," Seavey warns. (Seavey 1993, 944)

Sara Fine's article "Technological innovation, diffusion and resistance: An historical perspective" (1986) covers the literature of change, whether technological or not, and how people have always resisted change. She states that no matter how well technological innovation is planned out or communicated, "some individual will resist change whether through active aggression or passive retreat." (Fine 1986, 84) The "resistance phenomenon" still amazes managers in libraries, where most technology is not new. Fine reports that there is literature that suggests that librarians are predisposed to resistance because of "certain attributes of personality." (Fine 1986, 85) Other literature implies that the custodial nature of librarians provide a psychological barrier to change. However, even prior to wide spread automation in libraries (1980's through 1990's), library staff have resisted changes in tasks, where "negative attitudes manifested by absenteeism, turnover, underproduction and sabotage." (Fine 1986, 86) Some librarians wrote literature that outright opposed the use of technology as "fiscally irresponsible and managerially incompetent." (Fine 1986, 88) Fine goes on to trace the beginnings of resistance from even the 16th and 17th centuries of Europe to the present. Educators and librarians as well as businesses have become more aware of resistance. Theories on how to cope with resistance are now more commonplace in the literature. Fine reports that communication, along with a participatory management style is a thread that runs throughout the literature as a way to avoid resistance and technostress. "People need precise understanding of tasks and expectations," Fine says. (Fine 1986, 98) Training, too, is reiterated throughout the literature, but Fine concludes that "resistance will always exist" and that maybe the purpose of resistance "is to give us pause, force us

to slow down and impel us to pay attention to our basic human needs and values." (Fine 1986, 106)

Bengt Arnetz and Clairy Wiholm explore the psychosomatic symptoms of technostress in their article "Technological stress: Psychophysiological symptoms in modern offices."(1997) They state that due to radical reorganization and downsizing in business plus technological innovations in business, "uncommon syndromes have been reported." These syndromes are characterized by symptoms such as weakness, difficulty concentrating, chronic fatigue, eye and respiratory irritation, and memory disturbances, among others. (Arnetz and Wiholm 1997, 36) The authors studied the symptoms scientifically, finding "significant correlation between perceived workload and the psychosomatic index at three different assessments" (Arnetz and Wiholm 1997, 36) in cross sectional relationships. They tested the hypothesis "that mental stress was behind the observed increases in circulating prolactin" by making a study of stress management in telecommunication employees. A stress management program, the authors found, significantly resulted in lower levels of reported mental stress. Arnetz and Wiholm concluded that "their investigation has presented the case for technostress being predominantly a state of psychophysiological activation." (Arnetz and Wiholm 1997, 41)

Margaret Gaff's article "GUI vs. CUI: Individual personality types and the experience of learning to use library databases" (1994) focuses on how certain personality types have more difficulty using Character User Interfaces (CUI) than Graphical User Interfaces (GUI). Gaff explains the Myers-Briggs Personality Type Indicator, and how if "there is a mistake between type and occupation, the client usually reports feeling tired and inadequate." (Gaff 1994, 185) Using this type of information,

Gaff applied it to her own pilot project by taking a small sample of five participants. The personality types represented primarily introverts. Databases were selected that were both character based and graphics based. Each participant was given printed handouts on how to use the databases. The participants were then given three questions to which they were to find the answers on the CUI database first, and then on the GUI database for similar questions. (Gaff 1994, 187) The results were that all five participants found the GUI easy to use. Three out of five found the CUI "frustrating" to use, and one found it "challenging" while the remaining individual thought it was "very easy." This participant was an ISTJ personality type (Introvert, Sensing, Thinking, Judging), with a Thinking dominance. Gaff concludes that "understanding the implications of their own personality preferences and that of coworkers" can be illuminating for librarians and staff, and that to carry out this type of exercise, it would be wise to hire a practiced consultant or psychologist. (Gaff 1994, 190)

Benjamin Amick and Judith Jacobs explore the problems of automation in "Assessing the impact of automation on employee productivity and health." (1987) Clerical jobs are profoundly effected as technology advances, and increased productivity will drive industries to automate. As offices become more automated, new types of interpersonal conflicts will arise. (Amick and Jacobs 1987, 34) Training will also be a problem since organizations never budget for it. Changing work patterns create changing roles, patterns of communications and power and leadership changes. Technology may even interfere, according to the authors, with personal management styles, where face-to-face meetings may become obsolete due to e-mail. Social interaction is important and without social support, workers develop more illnesses and are "less satisfied with the

job." (Amick and Jacobs 1987, 37) Productivity then falls. However, the authors do not consider these conditions "technostress," instead stating that it is actually "technologically determined" since "stress" happened before automation. (Amick and Jacobs 1987, 39) Indeed, workers who lack control show the same symptoms whether there is technology in the office or not. Physical problems, such as eye strain or musculoskeletal problems can be prevented. The authors report three conditions in the workplace that can lead to stress and illness: social isolation, or lack of social support; lack of control over timing, speed and tasks; and finally, heavy workloads. (Amick and Jacobs 1987, 42) Employee assistance programs are recommended by the authors to help individuals under stress.

Gene Sullivan, Karen Darling and Bill Kara each give information in "Change and impact on serials staff." (1996) Sullivan first gives an overview of how serials librarians evolved, and how their world has changed due to automation. He believes a "sub profession" has emerged as clerical workers become "highly skilled technicians." (Sullivan, Darling and Kara 1996, 298) Training must be mandated in order to compete in a more computerized marketplace. Darling relates how her library migrated to InnoPac, and how automation has created the need to hire workers with keyboarding skills. She expresses a greater need for staff training on e-mail and electronic services. (Sullivan, Darling and Kara 1996, 300) Kara also reports the need to maintain a high level of skill to process materials such as CD-ROMS and electronic journals. Staff development is carried out in his library in small teams who train others on topics such as e-mail, using macros and DOS. All three authors agree that their libraries are in the

midst of change, and libraries have to keep up and adapt. (Sullivan, Darling and Kara 1996, 304)

School library media specialists are the subject of Sandra Champion's article "Technostress: Technology's toll." (1988) She states that "technostress threatens library media specialists by attacking their physical and psychological well-being," (Champion 1988, 48) and that managing changes in technology can impact the future of school librarians. Symptoms of technostress include resistance, intolerance, and panic, among others. Champion identifies four dominate personality profiles of school library media specialists: 1) Resistors, who deny the new, value the old; 2) Experimenters, who try new ideas scientifically; 3) The lover, who tries anything and loves everything new; and 4) The manager, who "thinks, plans, chooses selectively." (Champion 1988, 49) Champion believes that "knowledge is the key, and as times change, librarians need to change with them." Face changes head on and learn to reduce stress with positive feelings, meditation and decreased resistance to technological advancement, Champion advises.(Champion 1988, 51)

Training throughout life is the focus of Rita Hanna, Randy Ross-Ganguly and Barbara Ross's article "The wired administrator: Technology training and lifelong learning." (1995) They note that the "half-life of knowledge" is the "time it takes for one-half of worker's skills to become obsolete" and that time is now three to five years. (Hanna, Ross-Ganguly and Ross 1995, 5) Coupled with the rapid changes in hardware and software, technology training must be lifelong learning—once started, it should never stop. Teachers, support staff and managers all need to have continuous training. The authors recommend that a technology committee should be formed, including all

levels of staff. A needs assessment must be done of hardware, software and skills. Hire a consultant, they urge, since internal people have things to do. (Hanna. Ross-Ganguly and Ross 1995, 8) The authors also recommend the need for standardization in software (office suites) and hardware (printers, etc.). Training should be hands-on, and timing of the training is important. There should be no excuses for not attending training. Use people in teams for training. Technical support should not be haphazard, and a full time network administrator should be hired. The authors conclude that lifelong learning does not stop at any point, and that everyone needs a learning plan or road map. (Hanna, Ross-Ganguly and Ross 1995, 12)

Daniel Barron's article explains the anti-technology movement in "The Luddites are coming! Are we ready? Are they us?" (1996) He gives a brief history of the Luddite movement in England, which was spawned by the Industrial Revolution. Barron likens it to what is going on today. For example, the Second Luddite Congress is a modern day group whose founder begins his presentations by "bashing a computer with a sledgehammer." (Barron 1996, 49) The Lead Pencil Club is another group whose members are proud to be computer illiterate. Barron suggests that we take these and other groups seriously. "They represent . . . voices from taxpayers," he notes. Barron does go on to state that books, compact disks, CD ROMS, TV programs and web sites are all some sort of publication, and need to be used appropriately. (Barron 1996, 50)

Automation brings new issues to the fore for human resource managers in the article "Robotics and Technology: How to manage technostress." United States companies need "to automate, integrate or evaporate," according to Fred Foulkes, a professor of management policy and director of the Human Resources Institute, Boston

University. (*Personnel* 1984, 51) He states that companies need to assess what jobs should be automated, particularly ones that are "dull, dirty, or dangerous," or "hot, heavy, or hazardous." (*Personnel* 1984, 51) Policies need to be put into place regarding early retirement, displacement and reassignment of workers. Foulkes notes that "line management has been even more resistant to technological changes than hourly workers," and that training is the key for both managers and workers. (*Personnel* 1984, 52)

Steven Stone's article "Technostress: Taking some steps to cope" details how technostress is a real problem in the Cullom-Davis Library of Bradley University. Ten different interfaces create frustrations for user and librarians, as well as hardware problems like printers running out of paper. Stone states that training is the way his library deals with eliminating some of the problems. Communication, particularly when a problem occurs like system down time, is very important for both staff and users. Hardware is a factor in stress, so preventative maintenance helps keep machines running, and training is given on tasks such as loading paper in the printers and clearing paper jams. (Stone 1993, 35)

Frances Jacobson studies how boys and girls use both computers and libraries differently in "Gender differences in attitudes toward using computers in libraries: An exploratory study." (1991) A study was conducted in a high school for academically talented students. Forty-nine students comprised the senior class, and the students were required to engage in a year long formal debate project. (Jacobson 1991, 271) Among the tools students had available to use were word processing programs, InfoTrac and Wilson Indexes, as well as other CD ROM products, plus on online catalog. Results

showed a significant difference between boys' and girls' comfort levels. Girls found libraries "friendlier," while boys found computers "friendlier." (Jacobson 1991, 275) Computers in libraries tended to overcome the boys perception of the library, but the girls perception of the computer (although in the library) did not change: "The computer appears to have a dampening influence upon the totality of their [the girls] experience in the library." (Jacobson 1991, 276) That suggests that there is a female-based library culture versus a male-based computer culture.

Julie Pinnell reports on a program held July 8, 1997 in New York, in her article "Collaborative solutions to technostress."(1997) Among the presenters was Richard Hudiburg, who developed the Computer Hassles Scale. He explained that "techno-anxiety" affects those who feel pressured to use technology, and that there are two ways people usually cope with technostress: by using emotion-centered strategies, or by problem solving strategies. (Pinnell 1997, 1) Hudiburg also states that the Internet is fast becoming the number one technostressor for librarians. (Pinnell 1997, 1) Education and training is the only way to cope with evolving technologies. Guest panelist librarians Nancy Dewald, Gail Griffith and Catherine Palmer shared experiences of dealing with others in "technology induced stressful situations."(Pinnell 1997, 2) Application of new skills helped ease stress, they report, and staff training along with communication will also ease transitions.

Julie Bichteler's article "Human aspects of high tech in special libraries" focuses on technostress and librarians. Physical manifestations, such as eye strain and musculoskeletal problems, are increasingly being corrected by ergonomics. However, it is the psychological aspect which alters work, Bichteler states, as people feel they have

less control, and perceive greater fatigue. (Bichteler 1986, 122) Technostress behavior can take the form of vocal disapproval, passive avoidance, and outright hostility, while technocentered people over identify with computers. A study conducted of special librarians showed, however, that special librarians are less affected by technostress "than other working groups in our society that have been studied." (Bichteler 1986, 124) Word processing has eased document preparations. Programmers (librarians) thought that their personalities had changed to more efficient, organized and computer-oriented. The major source of technostress was inadequate training in hardware and software.(Bichteler 1986, 126) Most felt, however, that technology had enhanced their work.

Joanne Euster brings a management perspective to technological change in "Coping with changing times." (1995) She states bluntly that "change causes stress" and that technology is changing us. (Euster 1995, 60) Organizational charts are flattening, and administrators are now typing their own letters. Change causes anxiety, and stress comes from fear of the unknown and the loss of control. (Euster 1995, 61) Euster recommends breaking a problem down into smaller components. Making mistakes, she says, is only part of the learning process. Slowing down is also a way to reduce stress, since "sick and highly stressed employees are not productive."(Euster 1995, 61) As changes evolve, Euster concludes, learn from each other.

Craig Brod's article "Managing technostress: Optimizing the use of computer technology" (1982) explains the symptoms of technostress: resistance, increased errors and illness, which are all due to an inability to adapt to new technology. (Brod 1982, 754) Variables affect the probability of technostress, including age of user, perceived control, and past experience with computers. Brod describes patterns of avoidance behavior,

such as simply not using the computer, as well as those who suffer from overload, and cannot remember new procedures. An error cycle begins that leads to increased frustration. Brod states that often managers play a part, albeit unwittingly, in the technostress cycle by not using the technology, or by being anti-technological. (Brod 1982, 755) Training must take place to reduce technostress in three phases: educational, rehearsal and network training. "Network mentors" are employees who are given additional training in problem solving methods, technostress and leadership skills, and these mentors will be able to "monitor the environment for signs of technostress."

Carol Tenopir's article "Plagued by our own successes" (1998) relates the mixed emotions that librarians have about technology. Technology has brought a rise in service, but it is difficult to keep up with the rapidly changing world of hardware and software, and the myriad of interfaces. Library instruction has increased substantially, and the "need for librarian guidance to sources is becoming critical." (Tenopir 1998, 39) Staff training, too, is a challenge, with the numerous databases, range of software, among all the changes. Tenopir points out that collection development can be affected due to consortial agreements. Heightened expectations lead users to libraries with thoughts of instantaneous information online, and often the users leave behind tools such as print indexes. Technostress, however, can be a good thing. Several long time librarians expressed a revitalization of their work due to technology, whereas before they were getting bored with their jobs. (Tenopir 1998, 40)

Charles Bunge reports on how technology has become the new villain, in "CD ROM stress." (1991) Role conflicts are occurring more and more as non-reference duties like clearing paper jams and changing CD ROM discs take up librarians time. Multiple

interfaces give librarians "feelings of lack of control." (Bunge 1991, 64) Bunge does say, however, that librarians are adaptable, and need to take charge. Positive thinking and communication are key, plus the need for greater standardization. Training outside of the reference/work area is a must. Bunge concludes that "If we respond with negative attitudes and helplessness, CD ROM will be just another hassle that causes us pain and robs us of satisfaction at the reference desk." (Bunge 1991, 64)

Richard Hudiburg and James Necessary report on a study of college student computer users in "Coping with computer stress." (1996) Eighty-three students participated in the survey, and the Computer Hassles Scale was used to assess the level of user's stress. (Hudiburg and Necessary 1996, 116) Commonly reported computer problems that caused stress were 1) Hardware; 2) Software; 3) lack of knowledge; 4) lack of time; 5) computer lock-up; and 6) loss of in-put. Interestingly enough, there were no significant differences of stress due to age. The results were broken into two groups: high computer stress and low computer stress. The authors reported that based on the differences between the two groups, those who have high computer stress have "less computer skills and computer knowledge" than those with low computer stress. (Hudiburg and Necessary 1996, 121) Those with high computer stress are more likely to be aggressive and hostile in their coping strategy. Also, "emotional-focused coping" is often employed by high computer stress users than problem focused-coping.

Kitty Smith's article "Toward the new millennium," (1993) focuses on the fact that adaptation to technology can cause problems. Physical and mental fatigue are symptoms, as are feelings of powerlessness, distrust, alienation, self-doubt and anxiety. (Smith 1993, 210) Individuals express emotions at machines, not realizing that

computers are designed to follow instructions. On an organizational level, behavioral factors need to be considered in implementing technology. Automation has, according to Smith's research, changed the way we do things, how librarians are perceived, and the traditional organizational structure. Participatory management style, communication skills, patience and a commitment to training are all essential ingredients to successfully integrate technology into the library's schematics. (Smith 1993, 214)

Virginia Elder, Ella P. Gardner and Stephen R. Ruth look at clerical workers in "Gender and age in technostress: Effects on white collar productivity."(1987) They define technostress as a "computer generated" form of physical and emotional burnout, coupled with an inability to adapt to technological change. (Elder, Gardner and Ruth 1987, 17). The authors define "cyber-phobia" as slightly different, which causes victims to produce physical symptoms. Productivity is affected by technostress, and serious performance problems have been reported. A survey was conducted by the authors using the Computer Interest/Concerns Questionnaire. This questionnaire was created by Gardner, Render, Ruth and Ross and validated by a clinical psychologist. (Elder, Gardner and Ruth 1987, 18) The purpose of the survey was to elicit answers in order to diagnose phobia. The responses led to the formulation of four diagnostic groups: normal, non-avoider, anxious avoider, and phobic. Results found that 81.5 percent of participants were in the normal category, and only 18.5 percent were in the other three categories, which was combined to make one technostressed category. A significantly higher percentage of women were found to be technostressed than men, and age was also found to be significant in computer anxiety. (Elder, Gardner and Ruth 1987, 21) Twice as many clerical workers were technostressed than professionals.

Stuart Glogoff writes about library technology transition, in his article "Staff Creativity Lab: Promoting creativity in the automated library." (1994) In 1991, the University of Arizona staff and librarians worked in a "sparse micro-computing environment that inhibited creativity in the use of technology." (Glogoff 1994, 19) Few staff had access to personal computers, and software was limited to word processing programs. The transition began with a grant from IBM in which 100 IBM PS/2 machines were acquired. Twenty of the machines were used for OPACS and sixty-plus were assigned to staff. The remaining machines were put in a room that was designated as a lab for training programs. Apple Computer donated ten MacIntoshes, a scanner and a printer. These were then put into another lab—the Staff Creativity Lab. (Glogoff 1994, 20) Glogoff notes that the benefits of this lab has been that the staff is more comfortable with automation, and support networks have formed between and within departments. Software was selected, and hand-on training, seminars, and workshops help the University of Arizona meet the technology challenge.

Collin T. Ballance and Sydney Rogers use Richard Hudiburg's Computer Hassles Scale to survey students in their article "Psychology of computer use: XXIV. Computer-related stress among technical college students." (1991) The study was done to examine computer-related stress where computers are often used as "both an aide and the object of instruction." (Ballance and Rogers 1991, 539) Results affirmed Hudiburg's work that the Computer Technology Hassles Scale can be used to measure technostress. A moderate relationship showed that the technical students' attitude toward the computer is related to computer-related stress. However, there was no correlation between academic

achievement "and the measure of stress, computer attitude, or computer hassles were found." (Ballance and Rogers 1991, 542)

Sethi Amarjit, Denis H.J. Caro and Randall Schuler cover the sociological impact of technology on organizations in their article "Technostress management." (1986) They define technostress as a form of "social stress which is specific to new information technology." (Amarjit, Caro and Schuler 1986, 41) To prepare for this social stress, organizations need to adopt plans of "strategic choice," which has been defined as both "actions or rules for choosing actions in a conflict situation" and "long term planning." Strategic choice, when used in technostress management, should prepare an organizations' environmental condition. (Amarjit, Caro and Schuler 1986, 45) Options with strategic choice can be proactive, reactive or interactional. Identification and assessment is a must in order to reduce uncertainty and increase opportunity. The authors also break down strategic choice from organizational to individual to a societal level. Managing change and social responsibility are only part of the choices on a societal level. (Amarjit, Caro and Schuler 1986, 55)

Julie Bichteler focuses this time on library staff and users in "Technostress in libraries: Causes, effects and solutions." (1987) While the great majority of staff is open minded and accepting of new technology, Bichteler reports that there are a minority who are "resistors." Some staff may avoid technology, while others are outright hostile. Reasons for resistance may be due to age, fear of the unknown, job insecurity, performance anxiety and organizational factors. Bichteler gives a list of solutions for management who plan on implementing an automation system, including involving staff in decisions, communicating with staff about each step and preparing for

implementation and "hand-holding" the first week the system goes up. (Bichteler 1987, 284) Ergonomics are also a factor in technostress which management should pay attention to. End-users, or clients, also experience technostress, and the library staff needs to be available to help answer questions. Bichteler points out that end-user education, not just training should include basic information on how to search, subject headings arrangement and so on. (Bichteler 1987, 285) Printed instructions in the form of fliers or manuals also need to be available for patrons. Staff training is again considered crucial, but Bichteler reports that managers still do not heed the advice. Librarians have reported that sessions are too brief, or knowledge is assumed of certain systems, which staff have never seen. "Poor training engenders negative attitudes on the part of staff and these attitudes are quickly passed on to patrons," Bichteler concludes. (Bichteler 1987, 286)

Brian Quinn's article "Reducing stressful aspects of information technologies in public services" is a review of the technostress literature of the field. He uses both Craig Brod's(1984) and Amarjit Sethi's (1986) definition of technostress. Quinn highlights many points, including how on an organizational level, technostress may affect labor relations and staff morale. (Quinn 1995, 4) Role conflicts, age, lack of control and inexperience with computer systems as well as performance anxiety are some of the root causes of technostress. Job insecurity due to fear of obsolescence, or displacement, also has a role in computer anxiety. Organizational factors, such as lack of involvement of staff and lack of communication, are another aspect of cause. Quinn reports that solutions include communication and involvement of staff, a slower implementation process, adequate training and planning. Ergonomics should definitely be a

consideration in avoiding the physical side of technostress. (Quinn 1995, 19) Well designed user interfaces and hardware/software standardization are also cited as ways to reduce and avoid technostress. (Quinn 1995, 29)

James E. Walters and James R. Necessary study college students' attitudes toward computers in "An attitudinal comparison toward computers between underclassmen and graduating seniors." (1996) Several demographic factors were also considered : 1) by group (underclassmen versus seniors); 2) by gender; 3) number of university courses completed; 4) years of computer experience; 5) grade-point average; 6) overall computer knowledge; and 6) ownership of a computer. (Walters and Necessary 1996, 623) The study revealed a significant difference "between students attitudes and their overall knowledge of computers." The authors state that the results were predictably related to those who had taken courses, had computer experience and overall knowledge and owned a computer. (Walters and Necessary 1996, 629) However, according to this study, there were no significant differences due to gender. (Walters and Necessary 1996, 629)

John Friedlein discusses the technostress of university students in "Information overload may lead to 'technostress." (1997) He states that "college students seem particularly susceptible" to technostress, since some classes use LISTSERV, and electronic media now as an aide in teaching. Isolation and lack of social contact can cause feelings of alienation. (Friedlein 1997, 1) The other problem for college students is the credibility of information on the World Wide Web. However, a student that Friedlein interviewed advises other students to ask for help, since technology is always changing. (Friedlein 1997, 2)

Celina Pascoe's article "The impact of an integrated information management system on the job characteristics, satisfaction and motivation of library staff" looks at the staff of an Australian research library. While she reports that some studies show a blurring of lines between technical and public services as well as the creation of new positions and departments, there have also been elimination of jobs. (Pascoe 1996, 136) Pascoe used the Job Diagnostic Survey, which was designed to collect data on job attitudes. Results showed a decrease in job satisfaction, which was found to be due to concerns over health and safety. (Pascoe 1996, 139) Some workers felt isolated by the new technology. Yet, the respondents had positive expectations and attitudes toward technology and its impact on their jobs. Pascoe concludes that the study needs to be replicated because the "findings were, to a large degree, unexpected." (Pascoe 1996, 142)

CHAPTER III.

Methodology

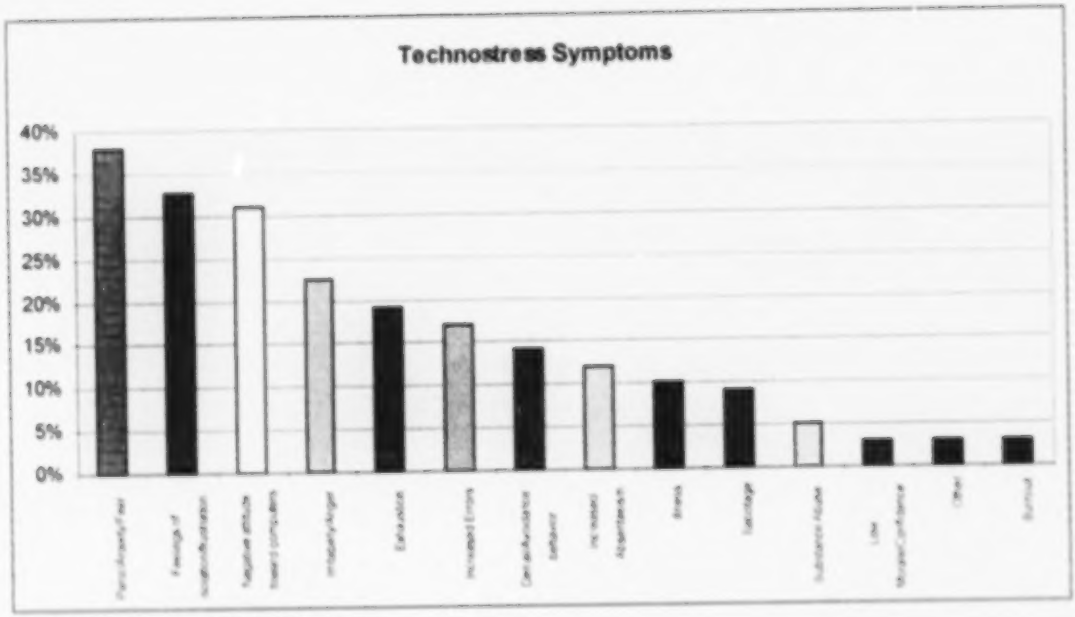
This is a content analysis of the literature of technostress. The information was compiled and literature analyzed in order to: 1) Define the symptoms of technostress; 2) Define the reasons for technostress, and 3) Define recommendations that illustrate how to avoid or combat technostress. A rudimentary coding sheet was created (APPENDIX A) in order to gather and group information. The coding sheet was used as a statistical tool to help tally information in order to draw conclusions about technostress.

First, articles were selected if they had "technostress" in the title, subject or abstract. Articles were selected from a number of databases, including *Library Literature*, ERIC, EBSCO 1500, Infotrac, Magazine Index, PsychAbstracts, Perodical Abstracts, and Electric Library. The literature is from both inside and outside of the library field. Articles were not included if they were reviews of other articles. A total of fifty-eight unique articles were gathered.

Secondly, a coding sheet was used for each article to analyze the recurring themes within the literature. The coding sheet was broken into sections, with three main areas of concentration: 1) Symptoms described for technostress, 2) Reasons stated for technostress, and 3) Recommendations for the avoidance and/or help to reduce technostress. Synonyms were reduced to one or two appropriate terms. Once each article was coded, then each area was tallied and broken down into percentages. The results were then graphed by the main areas of concentration on Microsoft Excel. The data was put into tables which are included in Appendix B.

CHAPTER IV.
Results

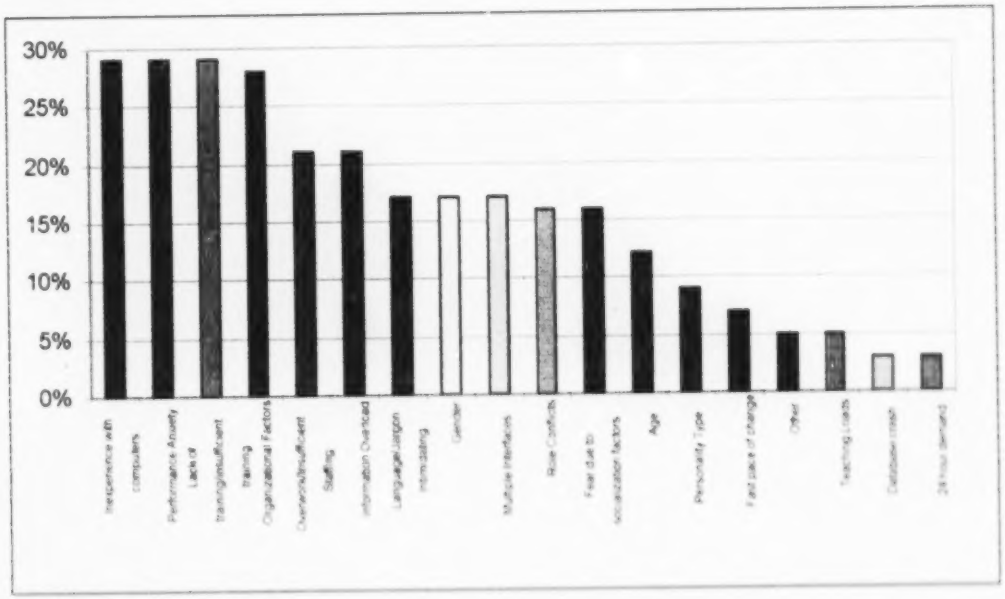
Symptoms.



The most common symptom given for technostress was "panic/fear/anxiety." Nearly 40% of the articles mentioned some kind of fear or anxiety, and almost 33% cited "feelings of isolation/frustration." (Graph 1) The third most common symptom, "negative attitude toward computer," was mentioned 31% of the time. At the lower end of the symptoms graph, "burnout" was mentioned in a scant 3% of the articles, while "illness" was named in 10% of the articles. It is the author's surmise that there is a thin line between "illness" and "burnout," thereby garnering a larger percentage if combined.

This compendium of symptoms is distressing, not just for the person suffering technostress, but for those who must work with, for, or manage these technostressed individuals. However, the literature suggests that there is often more than the implementation of technology that causes workers to feel stress.

Reasons



Graph 2. Reasons given for technostress in individuals

Many reasons were given as to why workers suffer technostress. (Graph 2.) "Inexperience with computers" (29%), "performance anxiety" and "lack of training/insufficient staffing" were the top three reasons given for technostress. Training, as Julie Bichteler (1987) says, is often advised but rarely implemented, and organizations are paying the price. "Organizational factors" also reflect a lack of awareness that some administrators have about participatory management, communication and staff involvement as a factor to success. "Gender" (17%) and "age" (12%), are both

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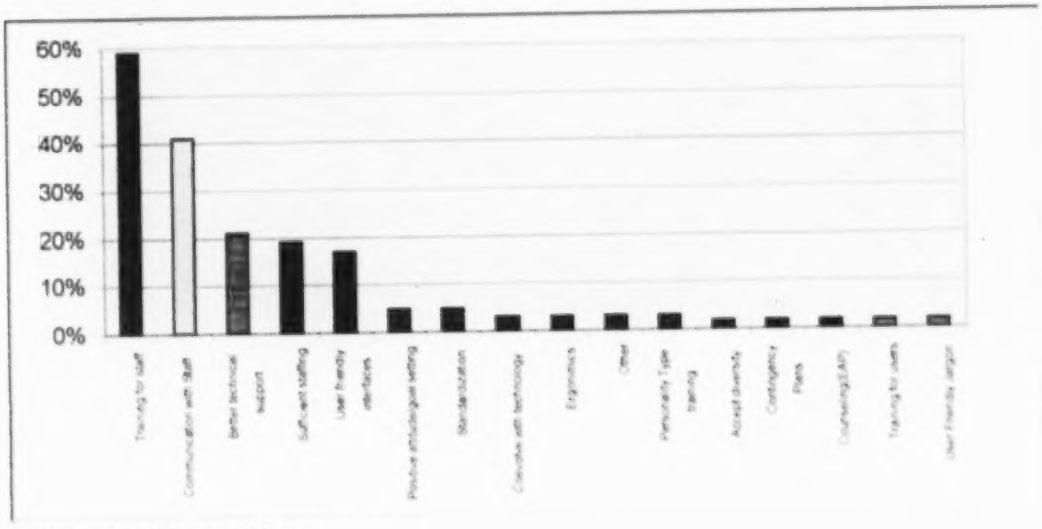
disturbingly high as factors, particularly since libraries are female dominated with an aging work population.

Many of the reasons given for technostress are unavoidable. As Sara Fine (1986) pointed out, no matter how much planning and training goes into automation implementation, someone will be a resistor. Yet, as organizations move into the future, there are ways they can work to lessen the technostress in their employees.

Recommendations



Graph 3. Recommendations for the avoidance of technostress

Perhaps the most underrated and ill-budgeted piece of advice is training. (Graph 3.) 59% of the articles mentioned training in some way for any implementation of technology. The articles that did not mention training were often factual studies, measuring attitudes, such as in the writings of Richard Hudiburg (1989, 1996) and Bengt Arnetz (1997). "Communication with staff" (41%), including staff involvement and participatory management styles, was the second biggest recommendation. "Better

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technical support" (21%), "sufficient staffing" (19%) and "user friendly interfaces" (17%) round out the top five recommendations for organizations.

CHAPTER V.
Conclusion

There are two fields of thought in the literature about technostress. The first field of thought is that technostress is a real problem, brought on by the implementation of technology into the workplace. The second field of thought is that technostress is another form of stress due to changes in the environment. Change is perhaps the keyword of both fields of thought. The technology evolution has only just begun and it changes everyday. Change, however, is not just about technology. It is about new ideas. Perhaps the one thing that none of the articles mentions is the ability for employees to keep an open mind and accept new ideas. Technology is a new idea, the young upstart that the oldsters cannot accept. Are librarians predisposed by their custodial natures to resist new ideas? (Fine 1986, 85) What will this do to the future of libraries, if this is true? However, libraries are not the only institutions who have technostress problems.

Administrators need to heed the literature's advice and implement consistent, hands-on training programs. Learning should never stop, as Hanna, Ross-Ganguly and Ross (1994) suggest in their article. Staff involvement should occur not just in automation implementation, but in many other areas of organizations. If the library staff were involved in other areas of the organization, morale would be higher and resistance would lessen. Finally, technology is here to stay. It will be ever changing, and even frustrating for those who are "technofreaks." (Bichteler 1989, 283) [Technology] resistance is futile.

APPENDIX A

CODING SHEET--TECHNOSTRESS LITERATURE

AUTHOR:_____. **TITLE:**_____
FROM:_____ **VOL.**__ **NO.**____ **DATE**_____

TYPE OF MATERIALS
___ Journals __Periodicals __Book ___Other

TYPE OF LIBRARY DESCRIBED IN LITERATURE
__Academic __Public ___Special ___School ___Other

IN FAVOR OF TECHNOLOGY (GENERALISATION) ___ Yes ___ No

WHO ARE THE USERS ___ Library Staff ___ Patrons/Customers/Clients

SYMPTOMS DESCRIBED FOR "TECHNOSTRESS:"

1 ___ Irritability/Anger
2 ___ Panic/Anxiety
3 ___ Exhaustion
4 ___ Increased absenteeism
5 ___ Illness
6 ___ Substance abuse
7 ___ Negative attitude toward computers
8 ___ Feelings of Isolation and frustration
9 ___ Sabotage
10 ___ Increased errors
11 ___ Other

REASONS STATED FOR "TECHNOSTRESS:"

1 ___ Inexperience with computer systems
2 ___ Loss of Prestige in library field/Role conflicts
3 ___ Language/Jargon intimidating
4 ___ Overwork/Insufficient staffing
5 ___ Fear due to socialization factors
6 ___ Performance Anxiety
7 ___ Information overload
8 ___ Organizational factors
9 ___ Age
10 ___ Gender
11 ___ Personality type (MBTI scale)
12 ___ Lack of training
13 ___ Training, but insufficient time frame
14 ___ Other

RECOMMENDATIONS FOR THE AVOIDANCE AND/OR HELP TO REDUCE TECHNOSTRESS.

1 ___ Training for staff
2 ___ Informing staff of impending changes/involvement of staff
3 ___ User friendly interfaces
4 ___ Better technical support
5 ___ Sufficient staffing, since computers take more time, not less
6 ___ Other

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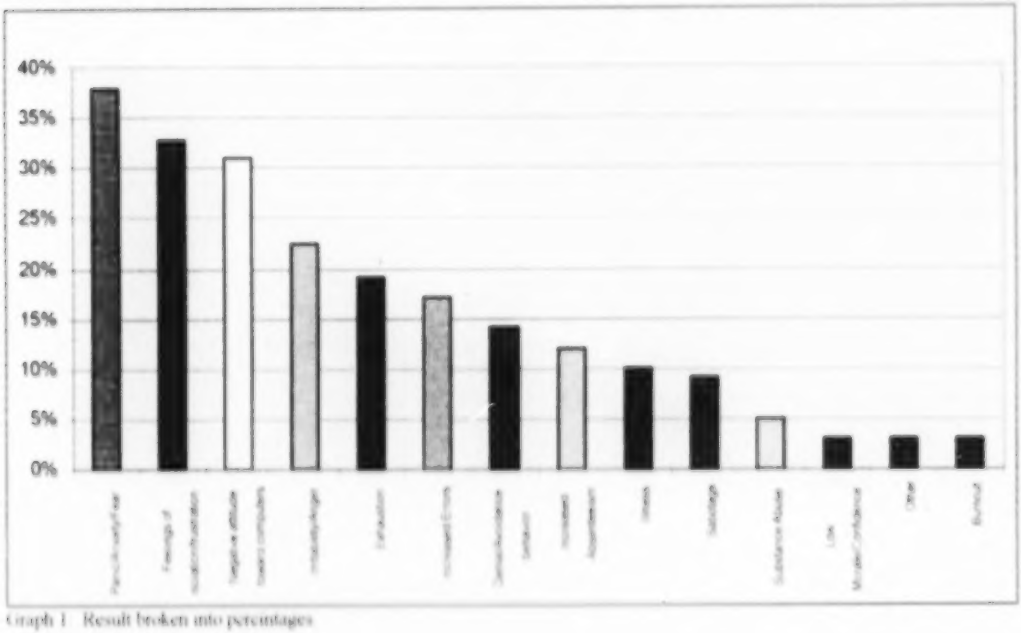
APPENDIX B.
Results of Technostress Coding Sheet

Symptoms of Technostress from the Technostress Coding Sheet

Symptoms	Percentage	Hits
Panic/Anxiety/Fear	38%	22
Feelings of isolation/frustration	33%	19
Negative attitude toward computers	31%	18
Irritability/Anger	22%	13
Exhaustion	19%	11
Increased Errors	17%	10
Denial/Avoidance behavior	14%	8
Increased Absenteeism	12%	7
Illness	10%	6
Sabotage	9%	5
Substance Abuse	5%	3
Low Morale/Confidence	3%	2
Other	3%	2
Burnout	3%	2
Difficulty Concentrating	3%	2

Table 1: Results of Technostress Coding Sheet.



Graph 1 Result broken into percentages

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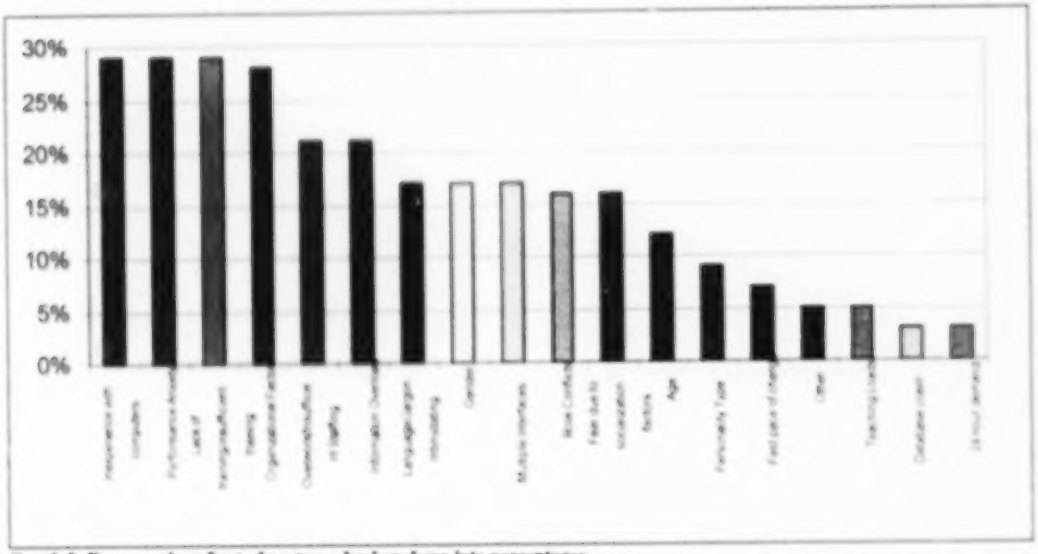
Reasons given for technostress from Technostress Coding Sheet

Reasons	Percentages	Hits
Inexperience with computers	29%	17
Performance Anxiety	29%	17
Lack of training/insufficient training	29%	17
Organizational Factors	28%	16
Overwork/Insufficient Staffing	21%	12
Information Overload	21%	12
Language/Jargon Intimidating	17%	10
Gender	17%	10
Multiple Interfaces	17%	10
Role Conflicts/lack of prestige	16%	9
Fear due to socialization factors	16%	9
Age	12%	7
Personality Type	9%	5
Fast pace of change	7%	4
Other	5%	3
Teaching Loads	5%	3
Database crash	3%	2
24 hour demand: e-mail, pagers,etc	3%	2

Table 2: Reasons given for technostress. Results from Technostress Coding Sheet.



Graph 2: Reasons given for technostress, broken down into percentages.

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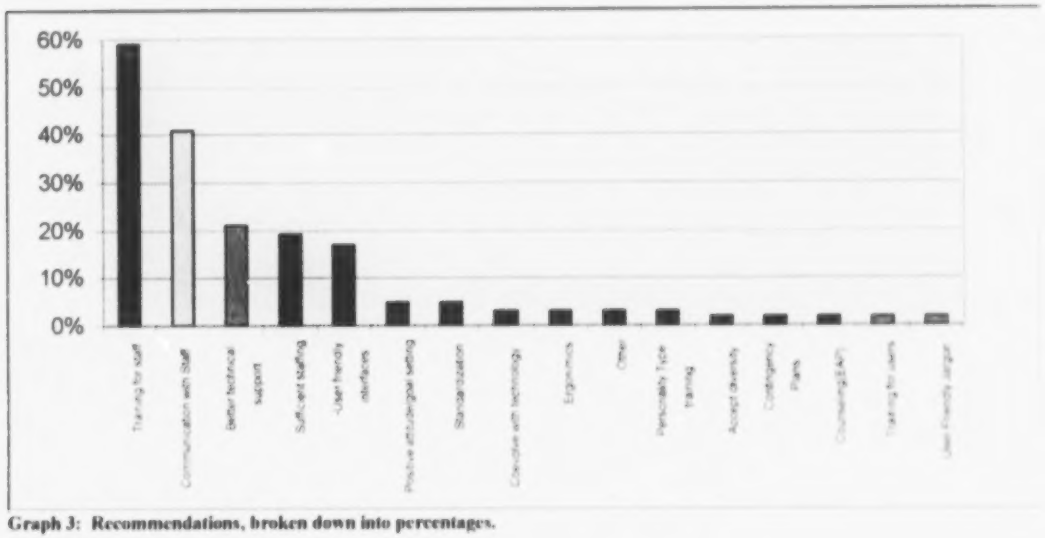
Recommendations for avoiding technostress from Technostress Coding Sheet

Reccommendations	Percentages	Hits
Training for staff	59%	34
Communication with Staff	41%	24
Better technical support	21%	12
Sufficient staffing	19%	11
User friendly interfaces	17%	10
Positive attitude/goal setting	5%	3
Standardization	5%	3
Coevolve with technology	3%	2
Ergonimics	3%	2
Other	3%	2
Personality Type training	3%	2
Accept diversity	2%	1
Contingency Plans	2%	1
Counseling(EAP)	2%	1
Training for users	2%	1
User Friendly Jargon	2%	1

Table 3: Recommendations. Hits and Percentages from Technostress Coding Sheet



Graph 3: Recommendations, broken down into percentages.

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REFERENCES

Amick, Benjamin C. and Judith H. Jacobs. 1987. Assessing the impact of office automation on employee productivity and health. *Employee Assistance Quarterly* 2, no.2 (winter): 31-46.

Arnetz, Bengt B. and Clairy Wiholm. 1997. Technological stress: Psychophysiological symptoms in modern offices. *Journal of Psychosomatic Research* 43, no.1 :35-42.

Ballance, Collin T. and Sydney U. Rogers. 1991. Psychology of computer use:XXIV. Computer-related stress among technical college students. *Psychological Reports* 69 (October): 539-542.

Barron, David. 1996. The Luddites are coming! Are we ready? Are they us? *School Library Media Activities Monthly* 13 (October): 48-50.

Bartlett, Virginia. 1995. Technostress and the librarian. *Library Administration and Management* 9, no.4 (Fall): 226-230.

Bichteler, Julie. 1986. Human aspects of high tech in special libraries. *Special Libraries* 77, no.3 (summer): 121-128.

Bichteler, Julie. 1987. Technostress in libraries: Causes, effects and solutions. *Electronic Library* 5 (October): 282-287.

Brod, Craig. 1982. Managing technostress: Optimizing the use of computer technology. *Personnel Journal* 61, no. 10 (October): 753-757.

Brod, Craig. 1984. *Technostress: the human cost of the computer revolution.* Reading, Mass.: Addison-Wesley Publishing Company.

Bunge, Charles. 1991. CD ROM stress. *Library Journal* 116 (April 15): 63-64.

Byerly, Greg. 1990. Introducing staff to change. *Computers in Libraries* 10 (December):39-40.

Call, Barbara. 1986. PC phobia: Lack of knowledge leads employees to fear their computers. *PC Week* 3 (November 18): 79-83.

Champion, Sandra. 1988. Technostress: Technology's toll. *School Library Journal* 35 (November): 48-51.

Clark, Katie and Sally Kalin. 1996. Technostressed out? How to cope in the digital age. *Library Journal* 121 (August): 30-32.

Daniels, Rachel. 1995. Effects on non-professional staff of the implementation of computer-based systems in college libraries: Some user studies. *Program* 29 (January): 1-13.

Dobb, Linda. 1990. Technostress: Surviving a database crash. *Reference Services Review* (Winter): 65-68.

Edwards, Catherine, Joan M. Day and Graham Walton. 1995. IMPEL Project: The impact on people of electronic libraries. *ASLIB Proceedings* 47 (September): 203-208.

Elder, Victoria, Ella P. Gardner and Stephen R. Ruth. 1987. Gender and age in technostress: Effects on white collar productivity. *Government Finance Review* 3 (December): 17-21.

Euster, Joanne. 1995. Coping with changing times. *Wilson Library Bulletin* 69 (May): 60-61.

Fine, Sara. 1986. Technological innovation, diffusion and resistance: An historical perspective. *Journal of Library Administration* 7, no.1 (spring): 83-107.

Fliotsos, Anne. 1992. Anxiety layering: The effects of library and computer anxiety on CD-ROM use. *Southeastern Librarian* (Summer): 47-49.

Friedlein, John. 1997. Information overload may lead to 'technostress.'" *University Wire* (October 1): 1-2.

Gaff, Margaret. 1994. GUI vs. CUI: Individual personality types and the experience of learning to use library databases. *Australian Library Journal* 43 (August): 183-191.

Galant, Debbie. 1994. The technology trap. *Institutional Investor* 28, no.5 (May): 141-143.

Giesbrecht, Walter and Roberta McCarthy. 1991. Staff resistance to library CD-ROM services. *CD ROM Professional* 4 (May): 34-38.

Glogoff, Stuart. 1994. Staff Creativity Lab. *Journal of Academic Librarianship* 20 (March): 19-21.

Gluckman, Mary. 1991. Dark side of the boom. *Omni* 13, no.7 (April): 36.

Goldsborough, Reid. 1997. Battling computer phobia. *Personal Computing* (October 30).

Groves, Bob. 1993. Man vs. Machines: Techno-terror. *The Record (Hackensack, NJ)* (September 19): A1+

Hanna, Rita, Randy Ross-Ganguly and Barbara Katz. 1994. The wired administrator: Technology training and lifelong learning. *School Business Affairs* 61, no.2 (February): 4-6, 8-12.

Hanson, Carl A. 1994. Trekking with the technoids: public service librarianship in the year 2010. *RQ* 34, no.1 (fall): 28-31.

Heaton, Shelly and Jeanne M. Brown. 1995. Staff perceptions of incentives and hurdles to the use of technology. *Computers in Libraries* 15 n.2 (February): 28-31.

Hickey, Kate. 1992. Technostress in libraries and media centers: Case studies and coping strategies. *Tech Trends* 37, no.2 : 17-20.

Hudiburg, Richard A. and James R. Necessary. 1996. Coping with computer stress. *Journal of Educational Computing Research* 15, no.2 : 113-124.

Hudiberg, Richard A. 1989. Psychology of computer use VII: Measuring technostress: Computer related stress. *Psychology Reports* 64 (March 27): 767-772.

Jacobson, Frances. 1991. Gender differences in attitudes toward using computers in libraries: An exploratory study. *Library and Information Science Research* 13 (July-September): 267-279.

Koenenn, Connie. 1990. Technostress: The high price of high-tech. *Star Bulletin and Advertiser (Honolulu, Hawaii)* (September 30): D1.

Kupersmith, John. 1992. Technostress and the reference librarian. *Reference Services Review* 20 (summer): 7-14.

Lally, Richard. 1997. Managing technostress. *Getting Results . . . for the Hands-on Manager* 42, no.10 (October): 5-6.

Larwood, Laurie. 1992. Women workers as users of computer technology. *Computers in Libraries* 12 (March): 38-39.

Livingston, Mike. 1993. Technophobic. *The State (Charlotte, NC)* (November 28): 1D+

Moreland, Virginia. 1993. Technostress and personality type. *Online* 17 (July): 59-62.

Nee, Eric. 1997. Self-help is on the way. *Upside* 10, no.10 (November): 198.

Palmini, Cathleen. 1994. The impact of computerization on library support staff: A study of support staff in academic libraries in Wisconsin. *College and Research Libraries* 55 (March): 119-127.

Pascoe, Celina. 1996. The impact of an integrated information management system on the job characteristics, satisfaction and motivation of library staff. *Australian Library Review* 13 (May): 135-146.

Pinnell, Julie. 1997. Collaborative solutions to technostress. *Http:www.harvard.edu acrl.html* : 1-2.

Quinn, Brian. 1995. Reducing stressful aspects of information technology in public services. *Public and Access Services Quarterly* 1, no.4 (February): 1-34.

Rafter, Michelle V. 1998. Technostress takes toll on Internet users. *Akron Beacon Journal* (January 12): D8.

Robotics and technology: How to manage technostress. 1984. *Personnel* 61, no.4 :51-52.

Rothberg, Donald. 1997. Fear and loathing of cyberspace not uncommon. *The Columbian* (October): A4.

Rowley, Jennifer. 1992. *Organizing knowledge.* Brookfield, VT.: Gower Publishing.

Seavey, Charles A. 1993. A failure of vision: Librarians are losing the war for electronic professional turf. *American Libraries* 24 (November): 943-944.

Sethi, Amarjit, Denis H.J. Caro and Randall Schuler. 1986. Technostress management. *Journal of Comparative Sociology and Religion* 13: 41-60.

Sever, Irene. 1994. Electronic information retrieval as culture shock: an anthropological exploration. *RQ* 33, no.3 (spring): 36-41.

Smith, Kitty. 1993. Toward the new millennium: The human side of library automation (revisited) *Information Technologies and Libraries* 12 (June): 209-216.

Stone, Steven A. 1993. Technostress: Taking some steps to cope. *Library Hi Tech* 11, no.3 : 35-36.

Sullivan, Gene, Karen Darling, Bill Kara and Jay Harris. 1996. Change and the impact on the serials staff. *Serials Librarian* 28, no. 3-4 : 297-304.

Tenopir, Carol. 1998. Plagued by our own successes. *Library Journal* 123, no.4 (March 1): 39-40.

Walters, James E. and James R. Necessary. 1996. An attitudinal comparison toward computers between underclassmen and graduating seniors. *Education* 116 (June 1): 623-631

Weil, Michelle and Larry D. Rosen. 1997. *TechnoStress: Coping with technology @work @home @play*. New York: John Wiley and Sons, Inc.

Woodward, Jeanette. 1997. Retraining the profession, or over the hill at 40. *American Libraries* 28 (April): 32-34.